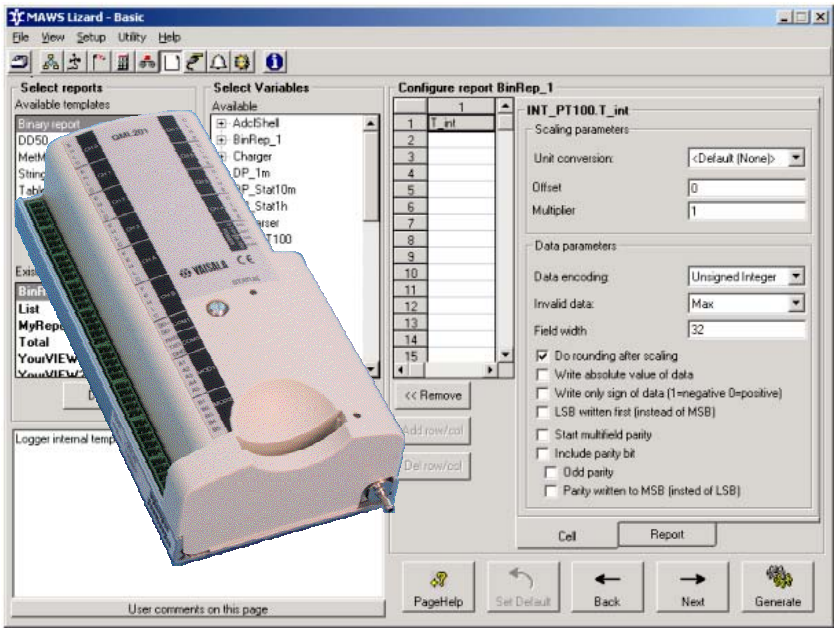
2005 Second Release (ver. 5.02) Features in MAWS and MAWS Lizard

TECHNICAL REFERENCE

M210728EN-A
September 2005



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CHAPTER 1

GENERAL INFORMATION

This chapter provides general notes for the manual and the product.

About This Manual

This manual supplements the existing MAWS documentation. This manual describes and provides instructions for using the new features included in the second MAWS system release in 2005, release 5.02. The information in this manual is valid for and above the following software versions:

- MAWS logger QML201 with software version 5.02
- MAWS Lizard and Terminal with software version 5.02

Related Manuals

Table 1 Related Manuals

Manual Code	Manual Name
M010141EN	MAWS Lizard Setup Software - User's Guide
M210662EN	Vaisala HydroMet™ System MAWS301 - User's Guide
M010114EN	Automatic Weather Station MAWS301 - Installation Manual
M210630EN	Automatic Weather Station MAWS201 - User's Guide
M210708EN	Vaisala HydroMet™ System MAWS100 - User's Guide
M210503EN	Configuring Satellite Transmitters - Technical Reference
M210267EN	Configuring Modem Options - Technical Reference

Feedback

Vaisala Customer Documentation Team welcomes your comments and suggestions on the quality and usefulness of this publication. If you find errors or have other suggestions for improvement, please indicate the chapter, section, and page number. You can send comments to us by e-mail: manuals@vaisala.com

General Safety Considerations

Throughout the manual, important safety considerations are highlighted as follows:

CAUTION	Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.

NOTE	Note highlights important information on using the product.

Recycling

Recycle all applicable material.

Dispose of batteries and the unit according to statutory regulations. Do not dispose of with regular household refuse.

Trademarks

Microsoft®, Windows®, Windows NT®, and Windows® 2000 are registered trademarks of Microsoft Corporation in the United States and/or other countries.

License Agreement

All rights to any software are held by Vaisala or third parties. The customer is allowed to use the software only to the extent that is provided by the applicable supply contract or Software License Agreement.

Technical Support

For technical questions, contact the Vaisala technical support:

E-mail helpdesk@vaisala.com

Fax +358 9 8949 2790

If the product needs repair, please follow the instructions below to speed up the process and to avoid extra costs to you.

1. Read the warranty information.
2. Contact Vaisala technical support via e-mail or fax and request for RMA (Return Material Authorization) and shipping instructions.

3. Proceed as instructed by Vaisala technical support.

NOTE	RMA must always be requested from Vaisala technical support before returning any faulty material.

CHAPTER 2

MEASUREMENTS

This chapter provides information on the measurement control of the new Vaisala HUMICAP® Humidity and Temperature Transmitter HMT330 Series.

Vaisala HUMICAP® Humidity and Temperature Transmitters HMT330 Series

The HMT330 series is a transmitter product family designed for different environments. From the MAWS viewpoint, all versions look identical. The current implementation measures the following variables:

- Air temperature
- Relative humidity

For more detailed information on the measured parameters, see Vaisala HUMICAP® Humidity and Temperature Transmitter Series HMT330 User's Guide.

Configuring HMT330

The HMT330 sensor is connected to MAWS through an RS-232 serial line. There are two alternatives to connect the HMT330 sensor to MAWS:

1. RS-232 autosend mode where HMT330 automatically sends measurement data to MAWS. Only one HMT330 per serial line is allowed.
2. RS-232 polled mode. Only one HMT330 per serial line is allowed.

The default data transmission parameters are the following: *9600 bps, 8 data bits, no parity, 1 stop bit*.

For more information on wiring of the RS-232 options, see Automatic Weather Station MAWS301 Installation Manual. For more information on configuring serial ports, see MAWS Lizard Setup Software User's Guide.

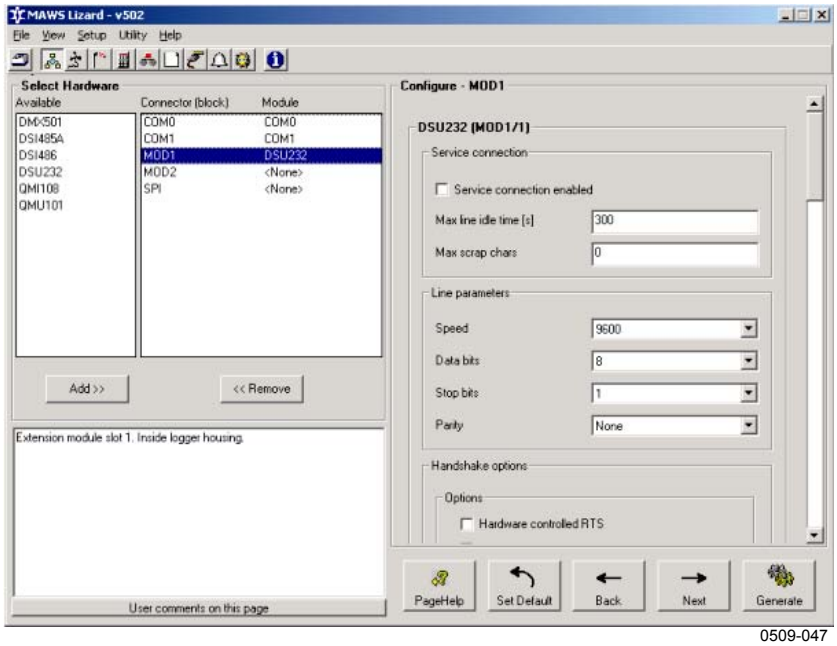
Sensor Configuration

HMT330 is configured using MAWS Lizard Setup Software. Proceed as follows:

1. Start MAWS Lizard.
2. Open an existing setup in the **Setup** view or create a new one.
3. Proceed to the **Hardware** view by clicking **Next** to configure serial transmission hardware, see Figure 1 on page 9.

   In this example, MOD1/1 on DSU232 is selected for use with the HMT330 sensor.

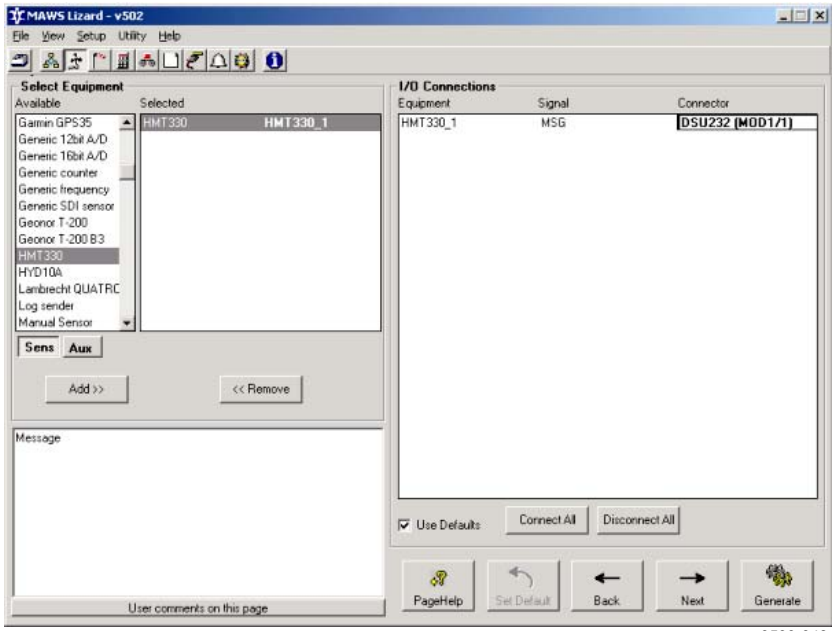
   You are recommended to keep the default settings in the **Line parameters** frame.



0509-047

Figure 1 Hardware View: Configuring Serial Transmission Hardware for HMT330

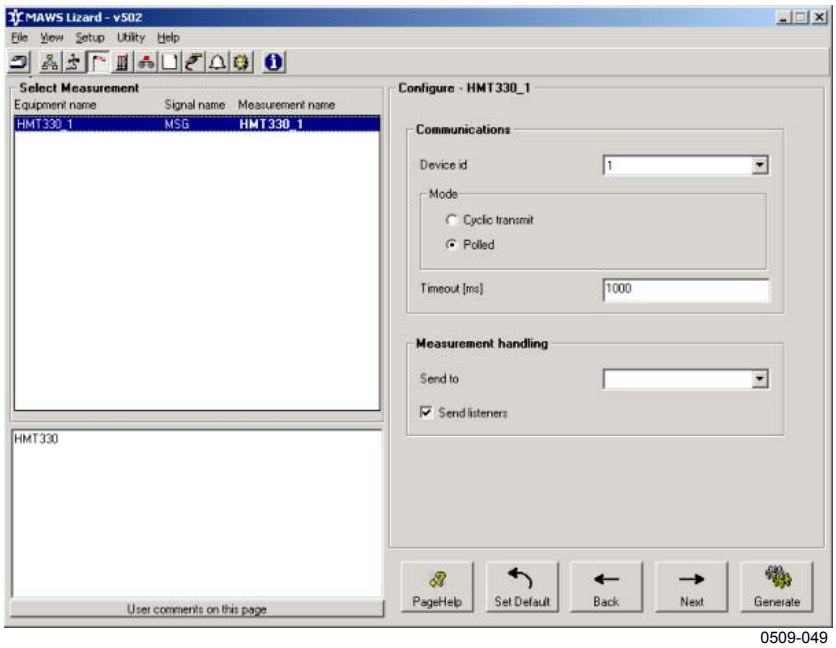
4. Proceed to the **Equipment** view by clicking **Next**, see Figure 2 on page 10.
   a. Scroll down the **Available** list for HMT330.
   b. Click the **Add** button to select HMT330.
   c. Double-click the **Connector** list for HMT330 in the **I/O Connections** frame in order to select the COM port.



0509-048

Figure 2 Equipment View: Selecting I/O Connection for HMT330

5. Proceed to the **Measurements** view by clicking **Next**, see Figure 3 below.



0509-049

Figure 3 Measurements View: Configuring HMT330 Communications Options

There are several parameter options you can set in the **Communications** frame of the **Measurements** view. Note that, in general, the predefined settings are the most suitable for a typical MAWS setup.

In order to change a parameter option, you simply need to select or unselect the corresponding check box. The following options are available:

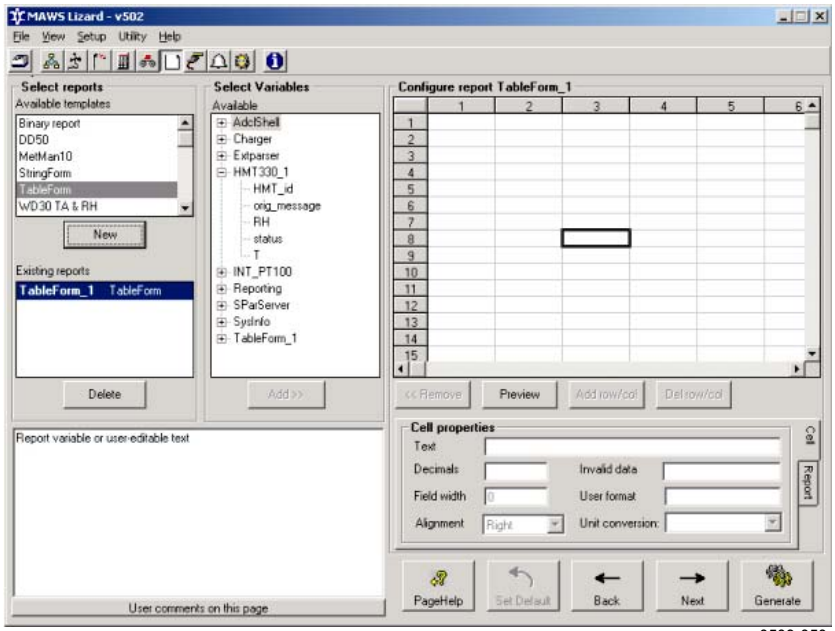
- Use the **Device ID** (editable) text box to distinguish HMT33. For information on how to change the device ID, see Vaisala HUMICAP® Humidity and Temperature Transmitter Series HMT330 User's Guide.
- Select the **Mode** in which HMT330 is operated. When you select the **Cyclic transmit** mode, HMT330 automatically sends data at predefined intervals. If you select the **Polled** mode, MAWS polls HMT330 at predefined intervals to retrieve data.
- In the Polled mode, by using the **timeout** parameter you can define the maximum length of time allowed for HMT330 to reply.
- In the **Cyclic transmit** mode, with the communication timeout parameters you can define a maximum interval between two messages. If the new message from HMT330 has not been received within the given time, the data in that message is then marked as invalid.

Using HMT330 Variables in Reports

You can use the variables received from HMT330 in MAWS Lizard like those from any other sensor.

To check which variables are available, proceed as follows:

1. Go to the **Reports** view.
2. Create a new report or select an existing one to include the variables for HMT330. See Figure 4 on page 12.
3. Click *HMT330_1* in the **Available** list box in the **Select Variables** frame.
4. Lizard displays the items that are available for the source in question. For more information on these variables, refer to Vaisala HUMICAP® Humidity and Temperature Transmitter Series HMT330 User's Guide.



0509-050

Figure 4 Reports View: Selecting HMT330 Variables

CHAPTER 3

COMMUNICATIONS

This chapter provides information on the new communication option, Iridium satellite transmitter, how to interface the Iridium satellite transmitter to MAWS, and more specifically, how to use the **Short Burst Mode** in binary transmission.

Iridium Satellite Transmitter

Iridium transmission using data calls can be used like any other modem. Thus, it has been possible to communicate through Iridium with MAWS in earlier release versions as well.

Iridium is the only data solution with a complete coverage of the Earth including oceans, airways, and Polar Regions. Iridium delivers the essential communications services to and from remote areas where no other form of communication is available. The Iridium constellation of 66 low-earth orbiting (LEO), cross-linked satellites operates as a fully meshed network and is the largest commercial satellite constellation in the world.

Short Burst mode (SBD) is a mechanism to deliver short data messages over the Iridium satellite network to the Internet. Each SBD message can be up to 1960 bytes in length.

For more information about Iridium communication, refer to www.iridium.com.

Configuring Iridium Transmission

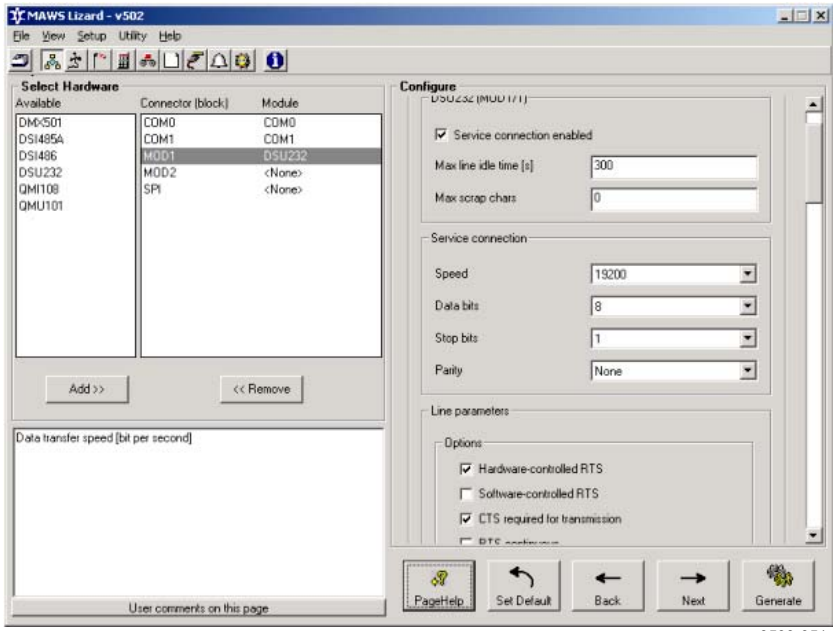
Iridium transmission is configured using MAWS Lizard. Proceed as follows:

1. Start MAWS Lizard.
2. Open an existing setup in the **Setup** view or create a new one.
3. Proceed to the **Hardware** view by clicking **Next** to configure the serial transmission hardware, see Figure 5 on page 15.

   In this example, MOD1/1 on DSU232 is selected for use with the Iridium sensor.

   You are recommended to keep the default settings in the **Configure** frame:

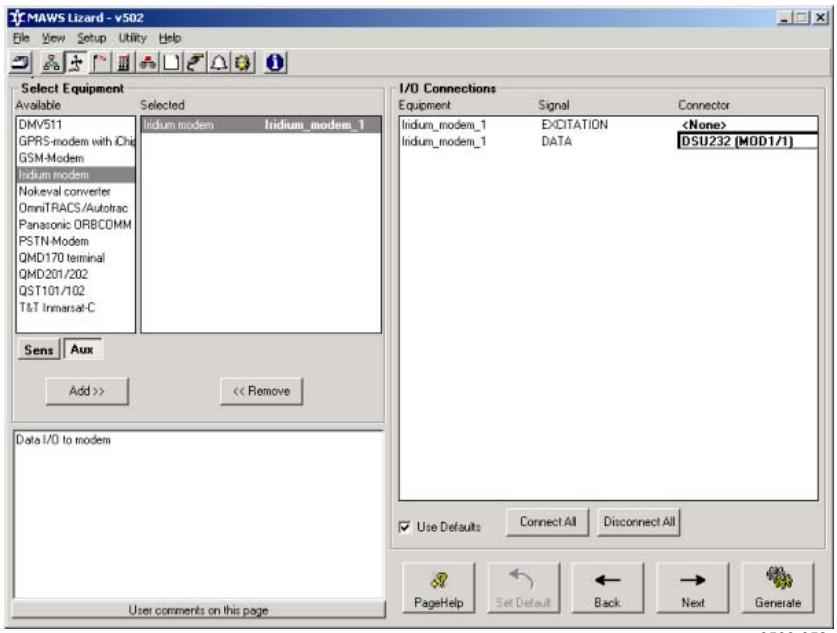
Option	Default Value
Service connection enabled	selected
Speed	*19200*
Data bits	*8*
Stop bits	*1*
Parity	*None*
Hardware-controlled RTS	selected
CTS required for transmission	selected



0509-051

Figure 5 Hardware View: Selecting Configuration Options for DSU232 MOD1/1 for Iridium Transmission

4. Proceed to the **Equipment** view by clicking **Next**.
5. Click **Aux** to list the communication devices, see Figure 6 on page 16.
   - Scroll down the **Available** list for Iridium.
   - Click the **Add** button and select Iridium.
   - Double-click the **Connector** list for *Iridium_modem_1* in the **I/O Connections** frame in order to select the COM port.
   - Leave the EXCITATION selection to <*None*>.



0509-052

Figure 6 Equipment View: Selecting I/O Connection for Iridium Modem

4. Proceed to the **Communications** view.

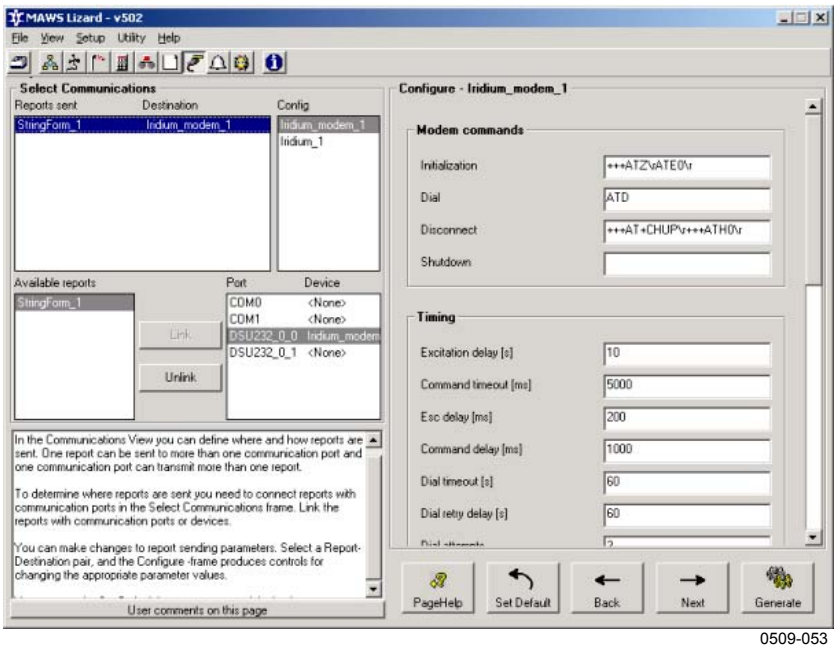
6. In the **Select Communications** frame, link a report to the Iridium mode, refer to Figure 7 on page 17.

   a. Select the report form from the **Available reports** list.

   b. Select a port having *Iridium_modem_1* as the device.

   c. Click the **Link** button to make a connection between the report and the Iridium modem.

   d. Modify the parameters in the **Configure** frame on the right.



0509-053

Figure 7 Communications View: Configuring Iridium Transmission Parameters

In order to adjust the parameters, refer to Configuring Modem Options Technical Reference. As a default, the parameters are set for using Short Burst Data (SBD).

There is also a new option for powering the device only when sending a report, see Figure 8 on page 18.

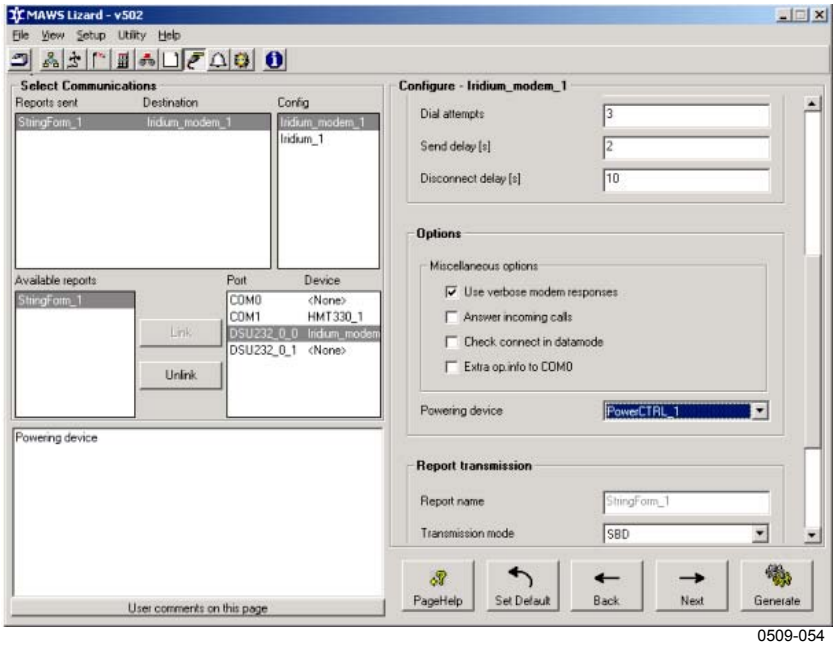
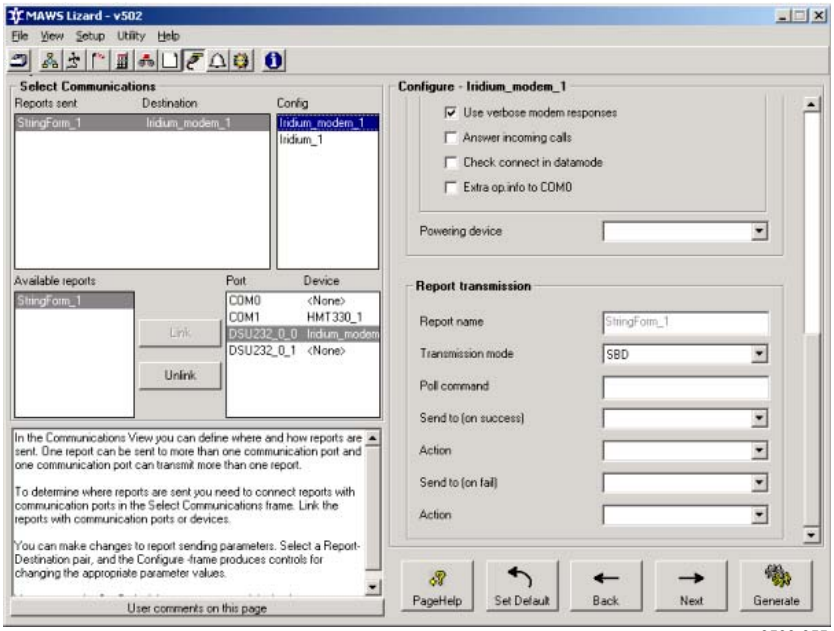


Figure 8 Communications View: Configuring Iridium Transmission Parameters Using Power Control Option

The **Powering device** option in the **Options** frame lists all the Power Control components in the setup. For more detailed information on how to use this option, see section Power Control on page 21.

7. Select the Short Burst mode in the **Report transmission** frame by choosing SBD from the **Transmission mode** list, see Figure 9 on page 19.



0509-055

Figure 9 Communications View: Selecting Report Transmission Options for Iridium

For the other options, make the same selections as for any PSTN modem.

The fields **Send to** (**on success** and **on fail**) are currently used only when transmitting via SBD. You should leave the fields empty unless otherwise informed.

Iridium Configuration Options

There are also configuration options for Iridium. You can view them by clicking *Iridium_modem_1* in the **Config** frame.

If the **Read clock time from Iridium** option is selected, the Iridium clock counter is read when the SBD transmission has been done and MAWS time is set according to this counter, see Figure 10 on page 20.

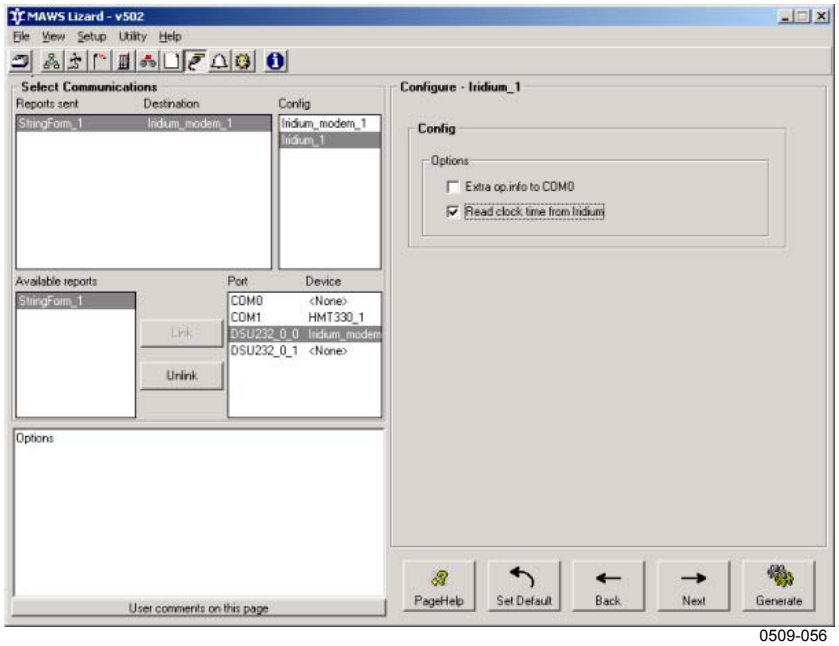


Figure 10 Communications View: Selecting Iridium Configuration Options

CHAPTER 4

CALCULATIONS

There are two new options available in the **Calculations** view:

- Power Control
- Timer

Both of these new options are located in the **Misc** list in the **Select Calculation** frame. For a variety of options, see also the **Conv** list.

Power Control

Power Control is used to control the physical output: either the output pin on the extension board (for example QMI108) or an excitation output on the logger.

With this option, it is possible to use the same output for several purposes so that the output pin will be active as long as there is one reservation left. For example, several sensors can use common powering without extremely careful synchronization of timing.

Configuring Power Control

To configure the Power Control option, proceed as follows:

1. Start MAWS Lizard.
2. Open an existing setup in the **Setup** view or create a new one.
3. Proceed to the **Calculations** view to configure Power Control, see Figure 11 on page 22.

4. Click **Misc** to list the available options.
5. Select *PowerCTRL* from the **Available** list and click **Add**.
8. Select the output to be controlled from the **Channel** list in the **Configuration** frame.

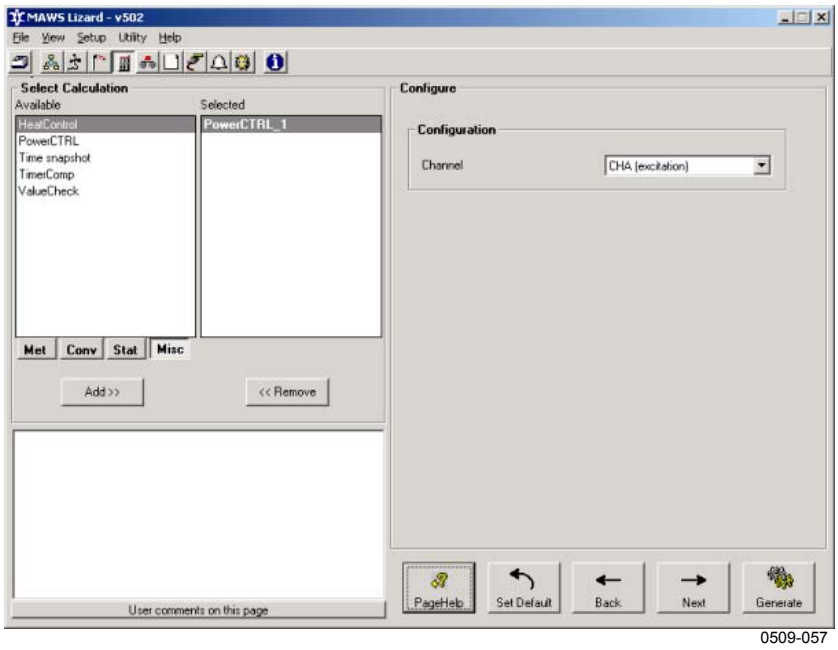


Figure 11 Calculations View: Configuring Power Control

Timer

Timer is used to create timed events that occur at a predefined time at specific intervals. These events resemble the timers in the **Timers** view but are more freely configurable to meet specific needs.

Configuring Timer

To configure the Timer option, proceed as follows:

1. Start MAWS Lizard.
2. Open an existing setup in the **Setup** view or create a new one.
3. Proceed to the **Calculations** view to configure Timer, see Figure 12 below.
4. Click **Misc** to list the available options.

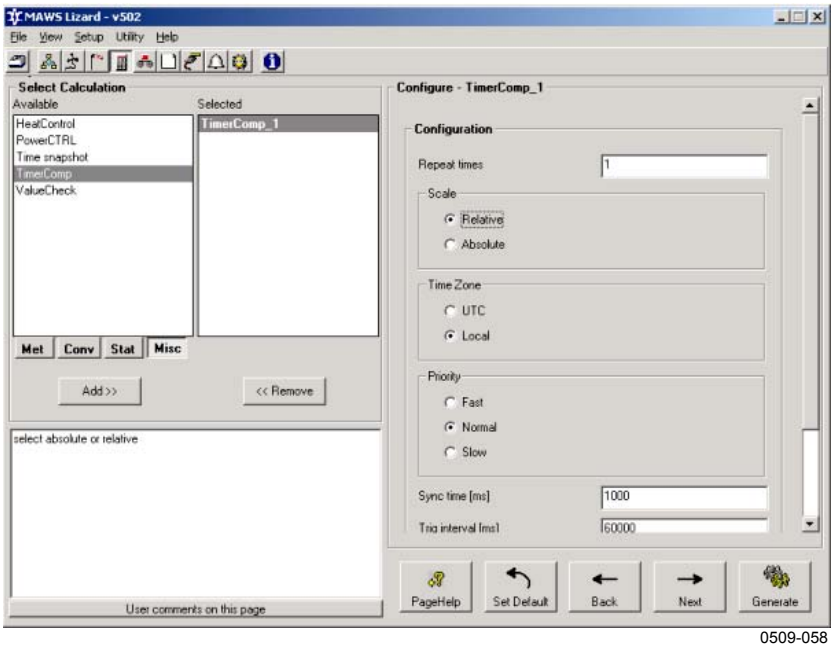


Figure 12 Calculations View: Configuring Timer

5. Select *TimerComp* from the **Available** list and click **Add**.

There are several configuration options in the **Configuration** frame on the right:

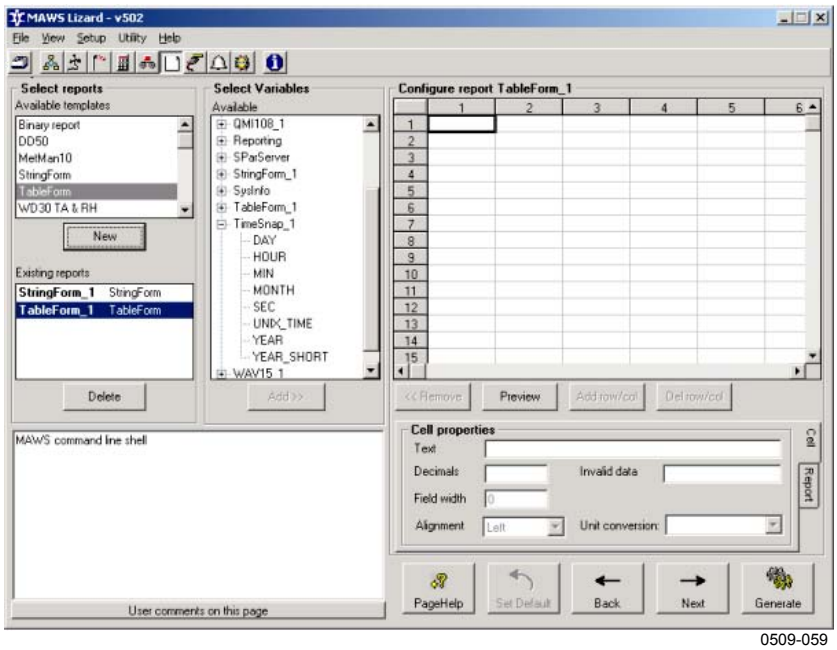
Option	Description
Repeat times	Defines how many timed events will be created
Scale	Indicates whether the timed events are tied to absolute time or whether they are relative and only the interval is meaningful
Time Zone	Specifies whether UTC or local time is used to calculate the timed events, if the scale selected is **Absolute**
Priority	Defines the priority of the timer. Typically, **Normal** or **Slow** are the most suitable options. A **Fast** timer should be used only in time-critical actions..
Sync time [ms]	defines the moment that the timed events are tied to (as in Timers view).
Trig interval time [ms]	Specifies the interval between timed events (as in **Timers** view).

Enhancement to Time Snapshot

Time Snap option has been enhanced to return also UNIX time, if requested.

This is an addition to the previous functionality and does not affect current setups.

You can use the UNIX time option in MAWS Lizard by selecting it from the **Available** list under **Select Variables** in the **Reports** view, see Figure 13 on page 25.



0509-059

Figure 13 Reports View: UNIX Time Option under Time Snap

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CHAPTER 5

REPORTS

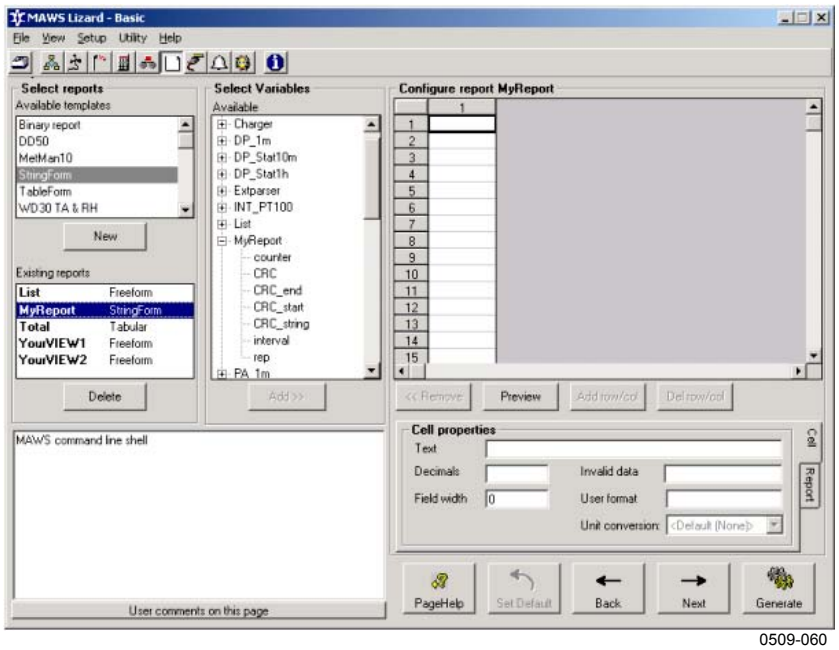
Checksum Option in Reports

With the MAWS software version 5.02 or higher, it is possible to add a checksum into the report that is already in the report configuration. You can also define where the data begins and ends in the checksum calculation as well as format the checksum fields to meet your own requirements.

Creating Checksum Report

To use the checksum option in a report, proceed as follows:

1. Start MAWS Lizard.
2. Open an existing setup in the **Setup** view or create a new one.
3. Proceed to the **Reports** view to configure a checksum report.
4. Open the available variables in the **Select Variables** frame. The configurable report in this example is *MyReport*, see Figure 14 on page 28.



0509-060

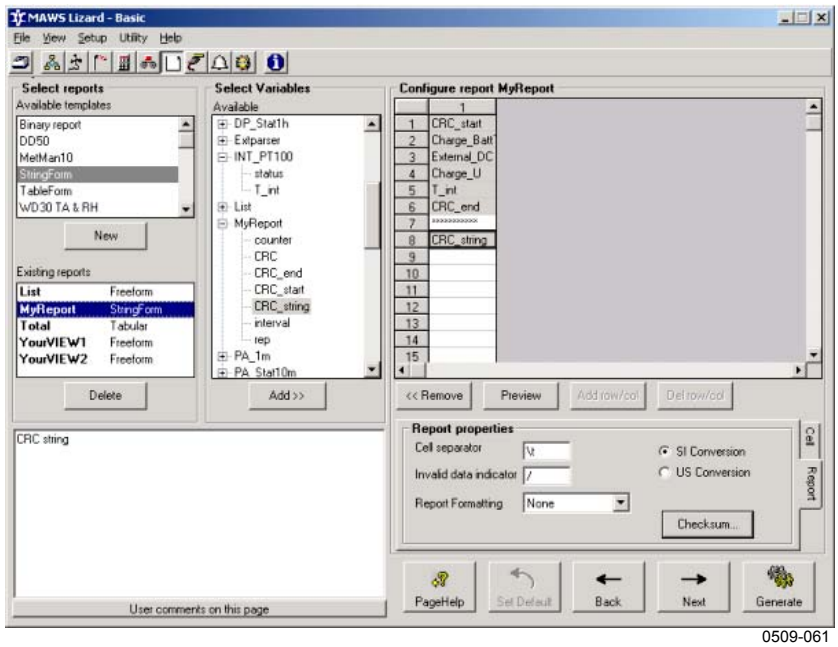
Figure 14 Reports View: Configuring New Checksum Report

There are new variables in the list that are used for calculating and showing the checksum:

- **CRC** returns the checksum to be formatted in a User format
- **CRC_start** indicates the start of data to be included in the CRC
- **CRC_end** stops calculating the CRC
- **CRC_string** returns the checksum in an ASCII presentation

To calculate a CRC, proceed as follows. Note that this procedure is an example of a typical case.

1. Go to the **Reports** view. See Figure 15 on page 29.



0509-061

Figure 15 Reports View: Adding CRC

The variables from rows 2 to 6 are taken into account when calculating the CRC.

The CRC is placed after the ******* string.

2. For the CRC calculation method, see the **Report properties** frame.
   - Select the **Report** tab on the right and click the **Checksum** button. The following **Checksum settings** window opens, see Figure 16 on page 30.

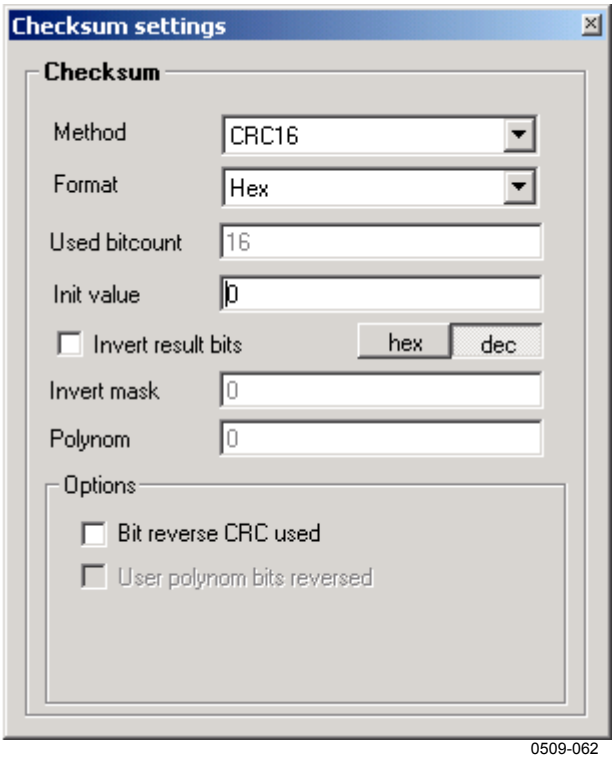


Figure 16 Checksum Settings Window

In the **Checksum settings** window you can define the following parameters:

- **Method**

Parameter Option	Description
SUM	Calculates a sum from the bytes to be included in CRC
XOR	Calculates an exclusive OR from the bytes to be included in CRC
CRC16	16-bit CRC
CRC32	32-bit CRC
USER CRC	User-defined CRC

- **Format**

Parameter Option	Description
Hex	Displays the CRC in a hexadecimal format
Hex LSB first	Displays the CRC in a hexadecimal format, Lower byte first
KERMIT	Kermit-style formatting
WXT	Vaisala Weather Transmitter style formatting

- **Used bitcount**, specifies how many bits are used to calculate the CRC. 16 bits is typical for SUM and CRC16, 8 bits is typical for XOR.
- **Init value**, indicates the start value for the CRC, that is, where the calculation is started. This parameter is also known as a seed.
- **Invert results bit**, can be used for bit inversion in the final CRC
- **Invert mask**, an informative field
- **Options**

Parameter Option	Description
Bit reverse CRC used	CRC is displayed in a reversed order, the lowest bit is exchanged with the highest bit and so on
User polynom bits reversed	Only available with USER CRC. The lowest bit is exchanged with the highest bit and so on.

Binary Report

With the MAWS software version 5.02 or higher, it is also possible to create binary reports, that is, reports where data is stored as binary instead of visible ASCII characters. It is also possible to pack data so that one data item uses only a limited number of bits.

Creating Binary Report

To configure a binary report, proceed as follows:

1. Start MAWS Lizard.
2. Open an existing setup in the **Setup** view or create a new one.
3. Proceed to the **Reports** view to configure a binary report.
4. Select *Binary report* from the **Available templates** list and click **New** to create a new report. See Figure 17 on page 32.

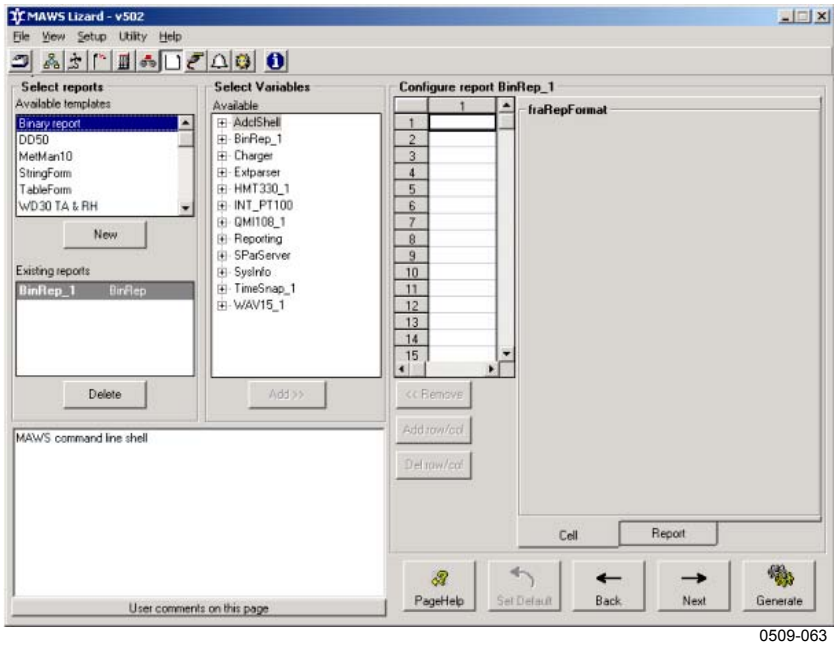
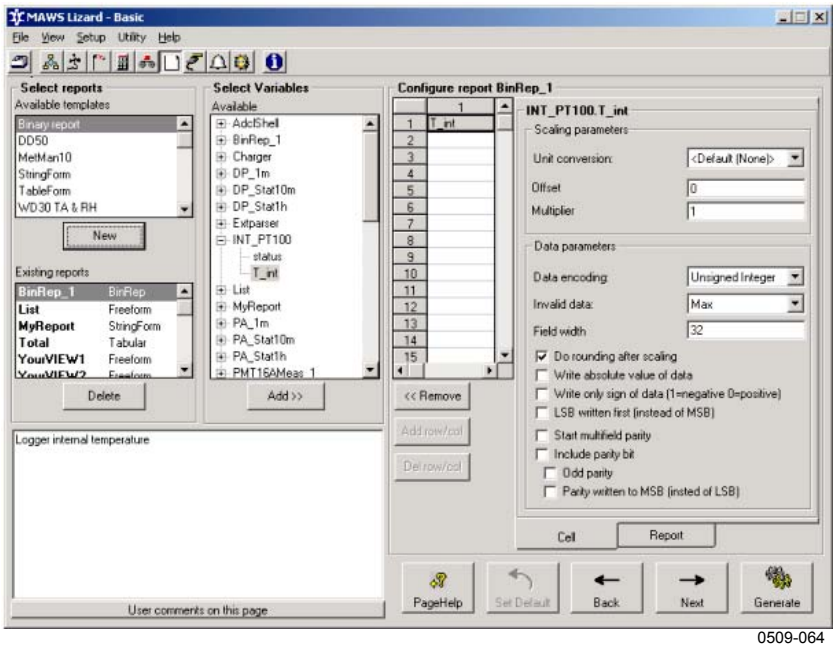


Figure 17 Reports View: Selecting Binary Report Form

A binary report is configured like any other report.

Binary reports differ from regular ones in the formatting of the data items. Each time a new item is added to a report, a formatting frame appears, see Figure 18 on page 33:



0509-064

Figure 18 Reports View: Binary Report Formatting Frame (1/2)

Scaling parameters define how the data item will be scaled into the binary report:

- **Unit conversion**, specifies whether the value will be converted to other units, for example from Celsius degrees to Kelvin. This parameter functions in the same way as in a regular report.

- **Offset** option, indicates whether some offset value is added to the value (after a possible conversion).

- **Multiplier** option, indicates whether the value is multiplied (after a possible conversion).

  If scaling is used, the following formula applies:
  New value = (value + Offset)·Multiplier

Data parameters define how the data value is coded in the binary report, for example how many bits are used:

- **Data encoding**, specifies the type of the value. The parameter options are the following:

Parameter Option	Description
Unsigned integer	Presents the value as a positive integer number
Integer	Presents the value both as a negative and a positive integer value
Float	Presents the value as a floating point number using 4 bytes: sign bit, 8-bit exponent, 23-bit mantissa
Double	Presents the value as a floating point number using 8 bytes: sign bit, 11-bit exponent, 52-bit mantissa
BCD	Presents the value as a binary code decimal

- **Invalid data**, used to indicate which value will be presented in the data field when the source parameter is invalid. The parameter options are the following:

Parameter Option	Description
Ignore	encodes the invalid input value as it is
Zero	Used as an invalid value
Min	specifies the lowest value in the encoding range as the invalid value
Max	specifies the highest value in the encoding range as the encodable value

- **Field width**, defines how many bits are used to encode the value. It is possible to use less bits than the data encoding value would require. For example, if 11 bits are used for an integer, only those 11 bits are stored in the binary report.

- **Do rounding after scaling**, indicates that the value is rounded to the nearest integer (after unit conversion and scaling).

- **Write absolute value of data**, indicates that negative values are multiplied by -1

- **Write only sign of data**, indicates that only a polarity bit is displayed for data item. The polarity bit is zero if the data

item is equal to or more than zero (positive value of the data item). Otherwise the polarity bit is one (negative value of the data item).

- **LSB written first**, indicates that the number is displayed in a reversed order (INTEL presentation)

- **Include parity bit**, indicates that a parity bit is added to this field to assure data validy. This option increases field length by one. See below for a description of the parameter options:

Parameter Option	Description
Odd parity	If selected, odd parity is used; otherwise even parity
Parity bit is written to MSB	Indicates that the parity bit is the most significant bit; otherwise the least significant

For information on how to add a checksum, see section Checksum Option in Reports on page 27. In binary reports, the CRC option should be used instead of CRC_string.

There are also parameters that you can retrieve from the binary report component in the **Select Variables** frame, see Figure 19 below.

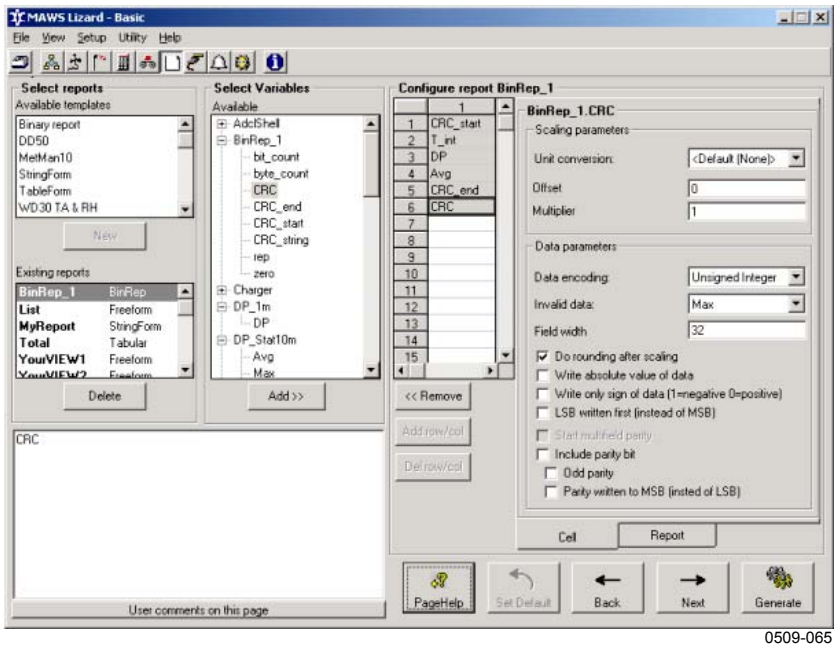


Figure 19 Reports View: Binary Report Formatting Frame (2/2)

- **Bit count**, indicates how many bits are included in this report

- **Byte count**, indicates how many bytes are included in this report

- **Zero**, return number zero. This parameter can be used to add a constant into the binary report. Offset and multiplier are used to set a constant using the following formula:

  constant = (Zero+Offset)·Multiplier(=1).

CHAPTER 6
ADDITIONAL FEATURE

Note that you can add your own comments in each MAWS Lizard view. Click **User comments on this page** below the information pane to add view-specific comments. The maximum number of characters allowed is 255.